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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/575,759	04/13/2006	Volker Hennige	287263US0PCT	5124
22850 7590 05/13/2008 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER BEST, ZACHARY P	
			ART UNIT	PAPER NUMBER
			4191	
			NOTIFICATION DATE	DELIVERY MODE
			05/13/2008	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/575,759	<b>Applicant(s)</b> HENNIGE ET AL.	
	<b>Examiner</b> Zachary Best	<b>Art Unit</b> 4191	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>08302006, 12212006, 06052007, 04112008</u> .                  | 6) <input type="checkbox"/> Other: _____                          |



**ELECTRIC SEPARATOR COMPRISING A SHUTDOWN MECHANISM,  
METHOD FOR THE PRODUCTION THEREOF,  
AND USE IN LITHIUM BATTERIES**

Examiner: Z. Best   S.N. 10/575,759   Art Unit: 4191   April 15, 2008

***Specification***

1.      Applicant is reminded of the proper language and format for an abstract of the disclosure. The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. **It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited.** The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details. The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

***Claim Objections***

2.      Claim 4 is objected to because it does not identify the carrier's element. For purposes of compact prosecution, Examiner has read Claim 4 as "carrier is polymeric and nonwoven."

Claim 10 is objected to for the terms "defined, desired." The terms are not indefinite, as the "defined, desired" temperature is further defined following the terms.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding Claim 1, the term “predetermined” is indefinite as the claim does not further define how the temperature is predetermined. See *Seagram and Sons, Inc. v. Mazall*, 84 USPQ 180 (CAFD 1950).

Regarding Claim 3, the term “flexible” is relative, and Applicant has not claimed the relation of the terms to that which is claimed.

Regarding Claim 23, a claim for the use of an element is indefinite if it merely recites a use without any active, positive steps delimiting how this use is actually practiced. *Ex parte Erlich*, 3 USPQ2d 1011

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-5, 7-10, and 12-24 are rejected under 35 U.S.C. 102(a) as being anticipated by Hennige et al. (DE 10238945 A1, based on corresponding U.S. Pre-Grant Pub. 2005/0221165 A1).

Regarding Claim 1, Hennige et al. teach a lithium battery separator having a shutdown function and comprising a porous carrier having a porous inorganic nonelectroconductive coating on and in said carrier (Hennige et al. claim 1), wherein the inorganic coating, which comprises oxide particles of the element Al, Si, and/or Zr having an average particle size in the range from 0.5-10  $\mu\text{m}$  (Hennige et al. claim 7), supports a porous shutdown layer, which melts and closes the pores of said inorganic layer (Hennige et al. claim 1), the shutdown layer being formed by a porous sheetlike structure (pars. 80 and 82) and the carrier comprising woven or non-woven polymeric or glass fibers (Hennige et al. claim 3).

Regarding Claim 2, Hennige et al. teach the shutdown layer is at least a nonwoven film (pars. 80-81).

Regarding Claim 3, Hennige et al. teach the carrier is less than 50  $\mu\text{m}$  thick (Hennige et al. claim 2).

Regarding Claim 4, Hennige et al. teach the carrier is polymeric and nonwoven (Hennige et al. claim 4).

Regarding Claim 5, Hennige et al. teach the polymeric fibers of the carrier are selected from fibers of polyacrylonitrile or polyester (Hennige et al. claim 5).

Regarding Claim 7, Hennige et al. teach the shutdown layer consists of polymers, polymer blends, and natural or artificial waxes (Hennige et al. claim 10).

Regarding Claim 8, Hennige et al. teach the shutdown layer consists of a material which melts at 120°C (par. 113).

Regarding Claim 9, Hennige et al. teach at least portions of the material of the carrier consists of the same material as the shutdown layer (pars. 99-100, where both contain polyethylene polymers, see also pars. 7 and 79).

Regarding Claim 10, Hennige et al. teach a process for producing a separator having a shutdown function which comprises a porous inorganic layer or a separator having applied to and fixed on it a porous sheetlike structure as a shutdown layer composed of a material which melts at a temperature not more than the melting temperature of the carrier material and less than the melting temperature of the inorganic layer (pars. 103-107, PET melting temperature is 250°C and PE melting temperature is 130°C, and silica melting temperature is 1710°C, see attached documents).

Regarding Claim 12, Hennige et al. teach the porous inorganic layer is hydrophobicized before the shutdown layer is applied to it (par. 72).

Regarding Claim 13, Hennige et al. teach the porous inorganic layer is treated with an adhesion promoter before the shutdown layer is applied to it (par. 73).

Regarding Claim 14, Hennige et al. teach the porous inorganic layer is produced by using a polymeric sol comprising a silane adhesion promoter for the shutdown layer to be applied later (par. 73).

Regarding Claim 16, Hennige et al. teach the shutdown layer is at least a nonwoven film (pars. 80-81).

Regarding Claim 17, Hennige et al. teach the shutdown layer applied to the porous inorganic layer is heated once at 60°C (par. 96).

Regarding Claim 18, Hennige et al. teach the shutdown layer applied to the porous inorganic layer is fixed by a single heating to a temperature above the glass transition temperature to incipiently melt the material without changing the actual shape (par. 81).

Regarding Claim 19, Hennige et al. teach the shutdown layer is applied by printing or pressing on (laminating, par. 80).

Regarding Claim 20, Hennige et al. teach the shutdown layer is applied to the porous inorganic layer and fixed by being trapped in a coil wound during battery fabrication (par. 82).

Regarding Claim 21, Hennige et al. teach the shutdown layer consists of a wax which melts at 120°C (par. 113).

Regarding Claim 22, Hennige et al. teach the shutdown material is polyethylene (par. 105).

Regarding Claims 23-24, Hennige et al. teach a battery comprising the separator of Claim 1 (par. 108).



Applicant cannot rely upon the foreign priority papers to overcome this rejection because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15.

7. Claims 10, 13 and 16-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Shi et al. (U.S. Pre-Grant. Pub. 2005/0014063 A1).

Regarding Claim 10, Shi et al. teach a process for producing a separator having a shutdown function (Shi et al. claim 14), which comprises a porous inorganic layer of a separator (par. 14) having applied to it and fixed on it a porous sheetlike structure as a shutdown layer (par. 11) composed of a material that has a melting temperature of not more than the melting temperature of the carrier material and less than the melting temperature of the inorganic layer (par. 11, silica melting temperature is 1710°C, see attached document).

Regarding Claim 13, Shi et al. teach the porous inorganic layer is treated with an adhesive (adhesion promoter) before the shutdown layer is applied (par. 15-16).

Regarding Claim 16, Shi et al. teach the shutdown layer is created by applying a porous film to the porous inorganic layer (par. 12).

Regarding Claims 17 Shi et al. teach the shutdown layer is applied at a temperature of about 120°C, which is less than the melting temperature of polyethylene of 130°C (par. 16, see attached document).

Regarding Claim 18-19, Shi et al. teach the shutdown layer is applied to the porous inorganic layer by laminating or incipiently melting the material without changing its shape (pars. 15-16).

Regarding Claim 20, Shi et al. teach the shutdown layer is applied to the porous inorganic layer and fixed by being trapped in a jelly roll (coil) wound during battery fabrication (par. 10).

Regarding Claims 21-22, Shi et al. teach the material for the shutdown layer is polyethylene polymer having a melting temperature of 130°C (par. 12, see attached document).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 1-9, 12, 14-15 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shi et al. in view of Hying et al. (WO99/62620 based on corresponding U.S. Patent No. 6,620,320 B1).

Regarding Claim 1, Shi et al. teach a battery separator for a lithium battery made from nonwoven polymeric fibers (abstract, par. 13) coated with a porous inorganic nonelectroconductive coating (par. 14) wherein said separator comprises a shutdown layer that melts and upon melting closes the pores of the nonwoven flat sheet (porous

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carrier, par. 11). However, Shi et al. fail to teach said porous inorganic nonelectroconductive coating has an average particle size of 0.5 to 10  $\mu\text{m}$ .

Hying et al. teach an ion-conducting separator comprising a porous carrier having a porous inorganic nonelectroconductive coating on and in said carrier (Hying et al. claim 22), the inorganic coating, which comprises oxide particle of the elements Al and/or Si (col. 6, lines 30-52), having an average particle size of at least 0.7  $\mu\text{m}$  (col. 6, lines 62-63), and a support (carrier, claim 22) comprising woven or felted polymeric or glass fibers (col. 2, lines 57-67). It is advantageous to coat the porous carrier with the ion-conducting composite because it improves relation to acids and has improved high temperature resistance (abstract and col. 1, lines 42-45). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to create the battery separator of Shi et al. wherein the porous inorganic nonelectroconductive coating comprises particle sizes of at least 0.7  $\mu\text{m}$  because Hying et al. teach that said coating will improve acid and high temperature resistance.

Regarding Claim 2, Shi et al. teach the shutdown layer is a porous film (par. 12).

Regarding Claim 3, Shi et al. teach the porous carrier has a thickness of 50  $\mu\text{m}$  or less (pars. 11-12, see separator thickness and shutdown layer thickness).

Regarding Claim 4, Shi et al. teach the carrier is polymeric and nonwoven (par. 13).

Regarding Claim 5, Shi et al. teach the polymeric fibers of the carrier are polyamides, polyacrylics (polyacrylonitriles), or polyesters (par. 13).

Regarding Claim 6, Shi et al. teach the shutdown layer is 0.01 to 10  $\mu\text{m}$  (par. 12).

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Regarding Claim 7, Shi et al. teach the shutdown layer is a polymer or polymer blend (par. 12).

Regarding Claim 8, Shi et al. teach the shutdown layer consists of a material which has a melting temperature of less than 130°C (par. 11).

Regarding Claim 9, Shi et al. teach the material of the shutdown layer and at least portions of the material of the carrier are identical (par. 12-13, e.g., both may be polyamides).

Regarding Claims 12 and 14-15, Hying et al. teach the porous inorganic layer is produced by using a polymeric sol comprising a hydrolyzed alkyltrialkoxysilane, which will hydrophobicize the porous inorganic layer as admitted in the instant specification (col. 8, lines 14-32).

Regarding Claims 23-24, Shi et al. teach the battery comprising said separator (abstract).

### ***Double Patenting***

10. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

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A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1, 3- 5, 7, and 23-24 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5, 7, 10, and 25 of copending Application No. 10/524,145. Although the conflicting claims are not identical, they are not patentably distinct from each other because the entirety of the copending claims are obvious to the instance Claims, and although the copending Application does not specifically claim "the shutdown layer being formed by a porous sheetlike structure," the copending application claims a "layer" and suggests a sheetlike structure (par. 82).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary Best whose telephone number is (571) 270-3963. The examiner can normally be reached on Monday to Thursday, 7:30 - 5:00 (EST).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

zpb

/Dah-Wei D. Yuan/  
Supervisory Patent Examiner, Art Unit 4191